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JULY 16, 1949

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Mrs. Lace-Wing

See Page 43

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## MEDICINE

# Blood's Color Death Sign

**Pearly white opalescence of the blood serum or plasma following exposure to X-rays signalled death to rabbits. May be applicable to human A-bomb victims.**

► WHEN the blood plasma or serum takes on a marked pearly white opalescence within 24 hours after exposure to X-rays or possibly atomic bomb rays, it is a sure sign of death.

This was true in the case of rabbits when X-ray doses were given over their whole bodies. Whether it is also true for humans and for radiation from atomic bombs has not yet been determined but seems likely.

Discovery of the opalescence as a sure sign of early death was made by Dr. Robert L. Rosenthal of the Radiation Laboratory and division of medical physics at the University of California. Part of the studies were aided by the Atomic Energy Commission and the Navy.

Dr. Rosenthal made his discovery in the course of studies of the blood clotting reaction after X-rays. All the animals showing marked opalescence of their blood serum or plasma died as a result of the X-ray

dosages within five days. Those with no opalescence or a lesser degree of it usually survived for at least 30 days, unless death came from other causes. If opalescence occurred, it appeared within 24 hours after irradiation and disappeared in all cases within three days.

Possible application of this death sign might be the rather grim one of weeding out among any future atom bomb victims those who were doomed to certain death from those who might be saved by immediate treatment.

Dr. Rosenthal is now trying, with the collaboration of Dr. John Gofman, to determine the chemical nature of the opalescence. Further study of it, he suggests in his report to the journal, *SCIENCE* (July 8) may lead to understanding of the nature of radiation sickness and how radiation kills.

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## MEDICINE

# Heat Danger Signal

► DURING heat waves, watch out for sudden stopping of sweating. This is the most important warning sign of impending heat stroke. It is likely to come on about the third or fourth day of a heat wave.

Keeping a look-out for this sign, by regular "sweat rounds," is one of the preventive measures which brought aged residents of the Home of Old Israel in New York through the heat wave of last August without a single death, although the weekly death rate for the city as a whole was more than 100% higher than the expected death rate for that week in August.

The "sweat rounds" and the rest of the stroke preventive program are described by Dr. Louis Friedfeld, chief of medicine at the Home, in a report to the *NEW ENGLAND JOURNAL OF MEDICINE* (June 30).

The program might be equally well followed for sick persons, the very young, and even to some extent by people in general. It calls for light, airy clothing, frequent bathing and proper skin hygiene. Physical exertion and prolonged outdoor exposure during midday are discouraged. Rest periods in well ventilated rooms are arranged. The diet is light, with increased sugar and starch and decreased protein. Salted foods are added to the diet and salt tablets are distributed to the residents of the Home at regular intervals. Plenty of drinking water and citrus fruit juices

are made available and supplementary vitamin preparations are furnished.

"Sweat rounds" are made by the staff of resident doctors to search out the characteristic warning sign of heat stroke. This, Dr. Friedfeld states, has been helpful in starting treatment of heat stroke early.

Treatment starts when a dry skin is noted during a heat wave, even if the body temperature is normal. (Very high temperature is a feature of heat stroke, sometimes going as high as 106 degrees Fahrenheit. Normal is 98.6 Fahrenheit for most persons).

The patient with dry skin is put to bed and his clothing removed. Since there are no air-conditioned rooms at the institution, sponge baths are given frequently and fans are used to keep the air circulating. The patient is encouraged to drink more water and take more salt. When necessary, salt solution is injected into his veins.

If he does not start sweating soon, or if he has a fever, he is put in an oxygen tent with air cooled to below 50 degrees Fahrenheit. The air is kept moving and the humidity low. Usually this treatment is enough, but if very high fever develops, the patient may be wrapped in cold wet sheets or sprayed from a water nozzle and fans are directed on his body.

Besides the stopping of sweating, patients getting heat stroke may have headache,

weakness, nausea or faintness. Or they may suddenly collapse in unconsciousness. Convulsions, vomiting, delirium or stupor and blue skin are other symptoms.

Heat stroke is the most serious of the three conditions that result from extreme summer heat, Dr. Friedfeld points out. The other two are heat cramps and heat exhaustion. In "sunstroke," either heat exhaustion or heat stroke may appear.

Heat cramps do not end fatally. Heat exhaustion comes when the circulation in small blood vessels fails. Normal persons do not usually die directly from heat exhaustion, especially if removed from the excessive environmental heat. But old persons, those sick with weakening diseases and those with impaired circulation may have their deaths hastened by heat exhaustion.

Heat stroke results from failure of the sweating mechanism through involvement of a part of the brain called the hypothalamus. Heat stroke alone may be responsible for deaths caused by excessive heat in previously normal persons.

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## MEDICINE

# Beryllium Damage to Skin And Lungs Is Similar

► BERYLLIUM causes the same kind of damage to the skin when it gets into it as it does to the lungs when it is inhaled. The damage in both cases consists of a kind of tumor which doctors call granuloma.

Two cases showing this were reported by Drs. A. D. Nichol and Rafael Dominguez of the St. Luke's Hospital in Cleveland in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

The physicians suggest that this skin condition can be prevented by cutting out the area contaminated by the beryllium before the cuts are allowed to heal.

Both patients had accidentally been cut by broken pieces of fluorescent light bulbs which are coated with zinc beryllium silicate. The cuts healed quickly but subsequently tumors made up of small fleshy masses formed in the scar. There was also ulceration and inflammation at the site of the cut.

Sections of this skin, removed for study, showed that beryllium was present, according to the doctors.

The patients had also developed lung poisoning from working in beryllium-contaminated air to which one had been exposed for four and one-half years and the other for six years. Drs. Nichol and Dominguez noted no change in the lung infection following removal of the beryllium deposits in the skin. Previous reports indicate, they said, that the lungs are not affected by beryllium infection of the skin. The lung damage comes from inhaling the metallic element.

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## MEDICINE

# Cancer from Glasses

Rimless glasses are believed cancer-producing because they conduct heat or chemical rays to the face. Lacquering the lens edge may prevent the danger.

► **CANCER** may be caused by wearing rimless spectacles. This discovery, plus a way to avoid the danger, is reported by four physicians of Jefferson Medical College in Philadelphia in the *ARCHIVES OF DERMATOLOGY AND SYPHILOLOGY*.

The danger can be avoided by putting a lacquer, known as rim black, on either upper or lower lens edge of the rimless spectacles.

The physicians making these discoveries are Drs. Edward F. Corson, George M. Knoll, Herbert A. Luscombe and Henry B. Decker.

They report 12 cases of skin conditions near the eyes which they believe were caused by heat or chemical rays conducted to the face by the rimless spectacles. In nine of these the condition was diagnosed as cancer and in another case as keratoses, a precancerous condition. The other two were considered cases of chronic actinic dermatitis, meaning a skin disturbance caused by light rays.

Certain types of spectacle frames, and above all the rimless ones with round or oval lenses, were found especially responsible for transmission of light and for focusing it on the skin below the lower

## ENTOMOLOGY

## Airborne 'Hopper Fight

► **THE** grasshopper war in the West this year is almost entirely airborne. This is the first time man has met the enemy in the latter's own element, and there is good reason to hope that the change in tactics will be to man's advantage—if only his ammunition holds out.

The latter point is a matter of some seriousness, stated Dr. W. L. Popham, in charge of field operations for the U. S. Department of Agriculture, who has just returned to base in Washington for conference. In the area of greatest menace,

edge of the lens.

The character of the lens, whether thick, thin, sphere, cylinder or prism, was responsible for a certain difference, but the doctors found the same principle existed in all cases in which a wholly or partially unobstructed rim of the lens was present.

The route followed by the light beam could be blocked readily at either edge by use of the lacquer, they reported. When carefully applied this lacquer was hardly noticeable but it did cut off entirely the rays the doctors believe responsible for the damage to the skin.

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covering some 50,000,000 acres in 16 counties in northeastern Wyoming and southeastern Montana, pre-seasonal campaign plans called for combat over about 1,500,000 acres, with only moderately heavy infestation expected. However, deep snow last winter protected the 'hoppers' eggs, and there has been a heavy hatch and high survival. Upshot is that the infested area is four times as large as anticipated, with more insects per square yard.

Federal and state field forces are now concentrating on the original area because infestation is worst there, and they have speeded up operations to the point where they expect to have all the poison-bran bait now on hand distributed by mid-July.

There are three government-owned planes at work, and 30 additional ones under contract. Biggest plane is a C47, which can lay down the poison barrage over 20,000 acres a day, working with two shifts of pilots. It carries three and one-half tons of poisoned bran per load, and with mechanical loading can fly a maximum number of sorties per day.

Thus far the grasshopper outbreak has been confined wholly to rangeland, with about 20 species of the insects involved. The worst of them, constituting about one-fourth of the enemy forces, is the same species that caused vast trouble in the thirties, for it is an active migrant. Dr. Popham is not too much worried about its getting into crop raising areas this year, since the great wheat areas of the Plains, next in line for attack, are already being harvested. However, surviving hordes that get a chance to lay their eggs next fall could leave a heritage of trouble for 1950. This is one of the reasons why Dr. Popham is hoping that funds for more ammunition may be forthcoming in the next few days.

The Nevada outbreak is a peculiar one, Dr. Popham stated. Only one species is concerned. It has the peculiar habit of laying its eggs in a few extremely concentrated areas, and of migrating in dense hordes from the very beginning of the season. Starting in the southern part of Ne-



**IMPRISONED LIGHT**—The cone-shaped beam inside the bottle, called resonance radiation, is produced by atoms of sodium vapor that catch the incoming light from the left and toss it out of the bottle scattering it in all directions so that it can be seen. Dr. Daniel Alpert of the Westinghouse Research Laboratories, one of the scientists studying what goes on in fluorescent lamps, electronic tubes, and other gas-discharge devices, demonstrates how light can be imprisoned inside a bottle.



vada, it has moved clear over the state in the past nine years, until it now threatens to cross the border into Oregon and California.

Because it has thus far been confined entirely to semi-arid rangelands, attack on this species has not been considered eco-

nomically justified. Now it may be necessary to get after it with poison, to prevent serious consequences next year. Fortunately, this species has proven quite susceptible to modern poisons, in experimental baitings.

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#### ENGINEERING

## Homes at Noiseless Sites

► THE home builder of the future may be able to select his site by referring to a city map showing the location of the principal sources of noise. In order to secure his building permit he may have to show that he has picked a relatively noise-free location or that his designs provide for acoustical treatment that would insure that acoustic comfort is combined with the other comforts of home.

This is the prediction of Dr. Leo L. Beranek, vice-president of the Acoustical Society of America and technical director of the Acoustics Laboratory at the Massachusetts Institute of Technology.

There is no good reason, he says in a report to *PHYSICS TODAY* (July 1), why our city administrators should not be as concerned with acoustic health as they are with plumbing, lighting and heating problems. We must persuade city officials to prepare city codes and city regulations that govern the location of factories, highways, airstrips and other sources of noise.

At present, he points out, lax building codes have permitted speculative builders to construct apartments and row houses with acoustically transparent walls and resonant floors. If the husband in the family upstairs spills his change when taking off his trousers, the people below feel as though they can count it as it rolls to a stop.

Noise from highways and airplanes has blighted many housing areas which would otherwise be assets to cities. Dr. Beranek reported seeing on the highway between

Worcester and Boston a stretch where house after house is marked for sale—because of noise. One owner said, "Sometimes I awaken during the night with the terrified feeling that a big truck is driving through our bedroom."

Long range planning is needed, Dr. Beranek feels, in the fields of building design, city planning, noise evaluation and noise reduction, and as a basis for such planning, research is necessary.

He urges a central building research station, perhaps financed by the combined building industries, for an initial ten-year period. Out of this station would come ideas for the future that would combine the five essentials of building: Structure, design, lighting, heating and acoustics. England already has such a building research station, and the English have constructed over 100,000 housing units in accordance with a building code requiring types of floor and wall structure developed at this station. This calls for a two-inch floating concrete floor on a half-inch soft glass-fiber blanket over a four-and-a-half-inch concrete slab. Party walls are of two-and-a-half-inch cinder blocks plastered and separated by two-inch air space. Such construction cuts down on noise so that fewer than one tenant out of four complained of being disturbed.

In Holland, there is an experimental apartment house about a block long with 48 apartments. In this building, tests are being made of 38 floor constructions, 32

partition wall constructions and 45 outer wall constructions.

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## RADIO

Saturday, July 23, 3.15 p.m., EDST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Pierre Auger, French physicist and head of the Natural Sciences Department of UNESCO, and other scientists will discuss "Report from UNESCO."

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## PHYSIOLOGY

# Cancer Causes Double

Plant studies that seem to be applicable to humans indicate that a substance harmless in itself can cause cancer when another substance is added to it.

► IT TAKES two to make that kind of biological quarrel commonly called a cancer. This has been definitely proved for plant cancers, and seems highly probable for human and animal cancers as well. Dr. Philip R. White of the Institute for Cancer Research, Philadelphia, declared before an international symposium on the growth and development of organisms in Strasbourg, France.

Demonstration of a dual causation of cancer did not come from a single set of experiments. Dr. White reviewed a long course of development in the study of tissue cultures and other artificially-stimulated growths, primarily in France and the United States, in which a considerable number of researchers took part, both independently and as teams.

First came the proof that plant tissues, both normal and tumorous, could be grown apart from the plants that produced them, in glass vessels containing suitable nutrient solutions. One of the necessary ingredients of such culture fluids was shown to be the plant growth hormone, indole acetic acid.

Then it was shown that one of the substances produced when crown-gall bacteria caused plant cancers was this same indole acetic acid. One of the steps in this demonstration was the growth of plant cancers when a weakened culture of crown-gall bacteria, in itself no longer able to start a cancer on a stem, received an assist in the form of artificially applied indole acetic acid.

Yet this acid, applied alone, does not produce plant cancer. Something else, as yet unidentified, is evidently produced by the bacteria. It is not the bacterial cell itself, or anything immediately produced by it; for if the bacteria are inoculated into the plant tissues, left there for some hours, and then killed by heat, the cancerous growth develops later on.

With these evidences for the dual nature of cancer production as clues, students of human and animal cancers have been examining the histories of the malignant growths on which they work for possible parallel cases, and they have been finding some indications that cancer causes in their field are at least as complex.

This, Dr. White admitted, makes the search for cancer causes, and hence for cancer cures, very difficult. However, he would not admit that the search is hopeless. Some research workers have developed techniques for culturing cancer tissues from single cells rather than from whole chunks, and this should trim down the problem materially.

Finally, his own present quest for a completely known and controllable nutrient solution for animal tissues, as successful as his solution for plant tissues has already been, has shown some promise of final success. Once it becomes possible to grow single-cell cultures in a definitely known culture medium, a long step towards final understanding—and hence conquest—of cancer will have been taken.

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## CHEMISTRY-ENGINEERING

## Synthetic Detergents May Be Fouling the Works

► SYNTHETIC detergents may be a boon to the housewife, but they are also under suspicion from chemists for fouling up the works—water works and sewage disposal works.

As the only new factor known, the soap-

less soaps are suspected of being to blame for settling tanks not settling. Water and sewage treatment chemists discussed this difficulty at a recent meeting of the American Water Works Association.

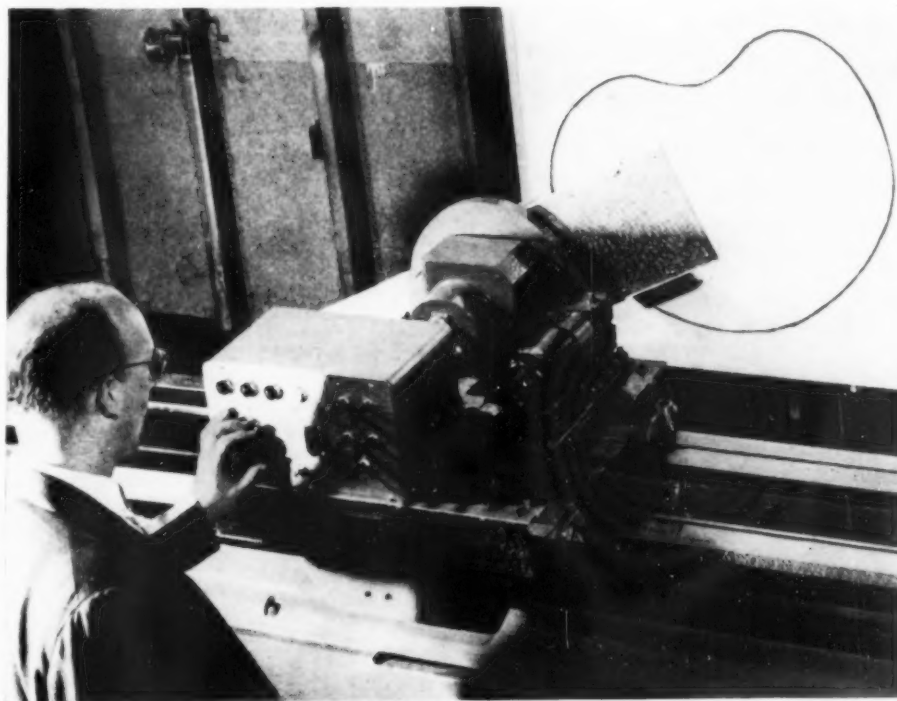
Circumstantial evidence against the synthetic detergents is the fact that the recent settling tank trouble seems to come early in the week. Monday washings with the new products look like a good bet for the blame, the chemists feel.

William Gallagher, superintendent of the Appleton, Wis., Water Department, said that his calculations placed the amount of detergents causing the difficulty at his plant on the order of one part per million. Lindsey Hobbs of the Standard Oil Company (Ind.) indicated that this would make it hard to get proof in blaming the new cleaners. He said that present techniques give only questionable results at concentrations as high as 200 parts per million.

Detergents in the water in very small amounts give an undesirable flavor ranging from soapy to bitter. And they can produce "off-odors", tests described by J. T. Cross of the Chicago Water Department indicated.

Conclusions of the chemists, reported in CHEMICAL AND ENGINEERING NEWS (June 13), were that methods of analyzing for smaller quantities should be developed and ways of decomposing the compounds needed to be found.

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**ELECTRONIC CUTOUT**—Called the "G-E contour following system," this instrument has an electric eye which follows the lines of a drawing through a microscope. It is connected to a metal-cutting tool which reproduces the drawing's outlines in metal. Developed by General Electric engineers, the device is designed to simplify manufacture of irregularly-shaped metal parts.



## MEDICINE-ENTOMOLOGY

# Check Sleeping Sickness

► SCIENTISTS at last may have the range in their fight against encephalitis, popularly known as sleeping sickness.

For several years a group of University of California scientists have made Kern county, a dry, hot valley area in the southern part of California, a virtual laboratory for the intensive study of this disease which is so much like infantile paralysis.

They now report that the disease has virtually vanished from the area, at least for the time being. There is a possibility that the disease is just playing 'possum, as epidemic ailments are wont to do.

But there has certainly been a dramatic drop in the cases of encephalitis diagnoses in Kern county since a vigorous mosquito control program was started three years ago by local authorities as a result of the scientists' findings.

Only one human case of encephalitis was diagnosed last season. There were eight cases in 1947, and 15 in 1946. Before that there were many more, some reliable estimates indicating that as many as 1,000 cases occurred in the California valleys in one season.

There has also been an enormous drop in the incidence of encephalitis in chickens,

a reservoir of the disease, since the advent of mosquito control. Before mosquito control, the scientists regularly found that 25% to 30% of the chickens of the area were infected. But now encephalitis is found in only about 2% of chickens.

These developments lend weight to the concept of the encephalitis cycle worked out by Dr. W. McD. Hammon, epidemiologist of the Hooper Foundation. Dr. Hammon found strong evidence that the mosquito was the culprit in the transmission of the virus from fowl to horses and man.

Several years must elapse before it is certain that mosquito control measures are responsible for the virtual disappearance of the disease, Dr. Hammon said.

In the meantime a team of scientists is on the scene in Kern county, studying the habits of birds and mosquitoes, collecting blood samples for analysis in the San Francisco laboratory. Cooperating in the continuing study are the Kern County Health Department, the National Foundation for Infantile Paralysis, the U. S. Public Health Service, the U. S. Army Virus and Rickettsial Disease Commission, and the State Department of Public Health.

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## MEDICINE

# Virus Disease Conquests

► SUCCESSFUL conquest of more of the deadly virus diseases by mold drugs such as aureomycin was predicted by Dr. Benjamin M. Duggar, microbiologist of the Lederle Laboratories, Pearl River, N. Y.

Dr. Duggar, the discoverer of aureomycin, made his prediction when he spoke as guest of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network.

Aureomycin itself, the golden-yellow drug from an earth mold, recently surprised its discoverer and other scientists by proving successful in routing the much larger than virus size germs of amebic dysentery from the bodies of victims of this rather widespread disease. (See *SNL*, June 25, p. 403).

Previously it had shown itself effective against such small germs as the viruses of primary atypical, or virus, pneumonia, lymphogranuloma, psittacosis, or parrot fever, and herpes zoster or shingles. It has given dramatic results in Rocky Mountain spotted fever and Q fever and has proved effective in experimental typhus fever.

Whooping cough, undulant fever, or brucellosis, tularemia, certain blood infections and venereal diseases, a form of mastitis in cattle which is a source of severe throat infections in man, and a heart in-

fection which often ends fatally are other diseases in which this mold drug has been used with success.

Although aureomycin is a new drug, first used on humans only a year ago, Dr. Duggar said it is "no doubt old in nature's storehouse of surprises."

Early drugs used against disease, such as quinine and the Indian arrow poison, curare, are the products of green seed-bearing plants, Dr. Duggar pointed out.

"With the newer antibiotic drugs, the lowly fungi are assuming dominance as objects of research in the field of natural drugs useful against infections" he said. "It is not that the molds are becoming more magnanimous. It is merely that we are becoming better acquainted with their potential magnanimity."

"A living world without molds would be vast in confusion, vast in rubbish, since fungi are the best scavengers of the tremendous annual tonnage of waste organic matter of field, forest, garden, and even the soil. The fungi must then be numbered among the converters of the dead and the discarded, restoring nature, by preparing for renewed production. Incidentally, among the many by-products of their growth activities are the antibiotics."

Describing the search for new drugs from

molds or fungi, he said:

"Taking the soil sample is often a mere matter of a knife and a cellophane envelope, or better, of a trowel and a pocket ointment tin, or an icecream cup. On the other hand, a thorough survey requires careful planning and systematic sampling."

"Exacting laboratory procedures must then be so adapted that representative molds are isolated from every sample. Surprising things may turn up on the isolation plates, and not infrequently a good antibiotic-producing mold may be spotted by the way that it affects the growth of neighboring bacterial and mold colonies, while not being itself pushed around. Each isolate that is selected from the isolation plate is cultured separately in a test tube, each is a pure culture, each is a potential—starter—for comparative work to follow later."

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## MEDICINE

# Heat Dangerous After Nerve-Cutting Operation

► PATIENTS who have had a nerve-cutting operation for relief of high blood pressure should be especially careful to keep cool with fans, cooling baths and any other possible means during heat waves.

This warning, which applies particularly to patients who have recently had the operation, is apparent from a report to the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

The report is by Drs. Jameson L. Chassin and J. William Hinton of New York University-Bellevue Medical Center. It concerns two patients who had had the operation and developed high fever, like that of heat stroke, during last August's heat wave in New York City.

Both patients had had extensive nerve-cutting operations which abolished the sweating mechanism. In both cases the operation had been performed only a short time before the heat wave struck. One was still in the hospital recovering from the operation.

Cold packs, a cold oxygen tent, electric fans and similar cooling measures helped these two patients recover.

The doctors find it surprising that this heat reaction does not occur oftener in patients who have had the extensive nerve-cutting operation, termed thoracolumbar sympathectomy. Although Dr. Hinton has performed it on over 500 patients, only one other case of such a reaction has come to their attention.

They believe that once a "readjustment period" of three months or longer has passed after the operation, the sweating mechanism returns in some areas via nerve pathways that have not been completely affected by the operation. This may account for the rarity of heat reactions in operated patients, but also points to the need for care during the first months after the operation.

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**FASTER READING**—First step is a film record made of the eyes with the ophthalmograph in the Pentagon's Reading Improvement Laboratory. Maj. Gen. Kenneth P. McNaughton's eyes are photographed by the instrument, as it is adjusted by Staff Sergeant Thomas J. Smith. Film record (left) made by the ophthalmograph reveals the number of stops or fixations made by the eyes in reading lines of type.

## PSYCHOLOGY

## Improve Reading Speed

Air Force officers are being trained in a special laboratory course to read 50% to 60% faster. This is done by increasing the span of what the eye takes in.

►THE same technique used during the war to teach aviation personnel to spot and recognize aircraft at the flit of a glance is now being used to train Air Force officers to speed up their reading.

The officers, including generals, are taking turns going to classes in a Reading Improvement Laboratory under the direction of Major B. E. Prater.

After six weeks spent in the Laboratory, the officers find that they can read on the average from 50% to 60% faster than when they entered. They can then go through their mountains of "paper work" much faster.

First step, when an officer goes to the Laboratory, is to photograph his eyes while reading. This is done with a scientific instrument called the ophthalmograph. The film record made by this instrument shows the number of stops made by the eyes in reading a line of type, and the number of times the eyes backtrack to re-read a diffi-

cult word or phrase. It shows up irregularities in rhythm of eye movements.

Basic to the new technique of reading training is a scheme for increasing the span of what the eye takes in at a single glance and the shortening of the time required for that glance. For this the tachistoscope is used. This machine flashes slides onto a projection screen.

At first, the machine is set so that each slide is seen for 1/25 of a second, the length of the shutter click when you are taking a snapshot with your box camera. Later the time is cut to 1/100 of a second. At the beginning of practice the slides contain numbers of five digits. The reader is soon able to recognize any of these numbers in 1/25 or even 1/100 second.

But the idea is to train the eye to cover a greater span in the same brief instant. So he next tries six-digit numbers and gradually works up to seven- eight- and even possibly nine-digit numbers.

This technique was worked out by Dr. Samuel Renshaw at Ohio State University to train men in flash aircraft recognition.

While the reader is lengthening his eye span he is at the same time breaking up any faulty reading habits of pronouncing, either aloud or silently the individual digits—it just can't be done at that speed. You have to learn to recognize by sight alone.

This is what the fast reader must do with the printed page. He must take in a phrase as a whole and not pay attention to individual letters or syllables.

Officers in the Reading Improvement Laboratory spend 30 minutes a day with the tachistoscope. Work is individual; each one has his own tachistoscope and works at his own speed, improving at his own rate. For the next 30 minutes, they move to another room to practice with the reading rate controller. This is a machine developed by Dr. Guy T. Buswell at the University of Chicago. It is equipped with a metal screen that slides down the page of a book at a regular rate, covering up what the individual has already read.

Next step is to carry over the habits learned on machines to the day-by-day reading for work or pleasure. This the officer does by reading one page on the reading rate controller and then turning off the machine and reading the next page in the normal way.

Science News Letter, July 16, 1949

## CYTOLOGY

## Electron Microscope Aids Study of Genes

►GENES, the ultra-minute biochemical units that determine the course of heredity in man and other organisms, are moved one step closer to positive identification and detailed mapping by a new method of preparing chromosome-containing cell nuclei for electron microscope photography developed by a three-man research team.

Involving several steps of chemical preparation, the careful squeezing of the nuclei to spread the chromosomes, and preliminary examination under high-powered ordinary microscopic lenses, the new technique has been employed on immature human male sex cells, as well as on material from fruit-flies. An illustrated report of results is presented in SCIENCE (July 1).

A feature brought out by the electron microscope, never detected with even the highest powers of the ordinary microscope, is an ultra-fine web of connecting threads between the chromomeres or segments of individual chromosomes. Their significance has not yet been interpreted.

Participating in the research were Dr. Jack Schultz of the Institute for Cancer Research in Philadelphia, Dr. Robert C. MacDuffee of the Army Medical Center, Washington, D. C., and Dr. Thomas F. Anderson of the University of Pennsylvania.

Science News Letter, July 16, 1949



## BOTANY

## Fungi Present Evidence Of Aid to Plant Roots

► PROOF that fungi on plant roots help the plants in absorbing mineral nutrients from the soil has been written by the fungi themselves on photosensitive plates, in experiments carried out by Drs. Paul J. Kramer and Karl M. Wilbur at Duke University in Durham, N. C.

Many species of trees and shrubs, and some herbaceous plants as well, have the smaller branches of their roots densely covered with a fine web of fungous hairs, known to botanists as mycorrhiza. It has long been assumed that mycorrhiza aid roots in absorbing water and minerals from the soil, but conclusive proof has been lacking.

Drs. Kramer and Wilbur prepared a solution of radioactive phosphate, and immersed in it the roots of pine seedlings, both with and without mycorrhiza. Then they laid the roots on photographic plates, separated from the plates only by a thin layer of aluminum foil. The radioactivity of the phosphorus recorded itself as bright outlines on the sensitive emulsion. Roots with mycorrhiza registered themselves much more strongly than roots without the fungous webs.

An illustrated report of the results of these experiments is presented in the journal, *SCIENCE* (July 1).

Science News Letter, July 16, 1949

## MEDICINE

## Allergic to Cottonseed but Not to Cottonseed Oil

► APPARENTLY you can be allergic to cottonseed without being allergic to cottonseed oil such as you get in some salad dressings.

Two cases of this kind of allergy, which is somewhat contradictory to textbook statements on the subject, are reported by allergy researchers of the Department of Agriculture and a Washington, D. C., physician in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

The scientists are Drs. E. J. Coulson, Henry Stevens and H. S. Bernton.

One of the patients was a physician who himself is a recognized specialist in allergies. He had had hayfever since 1930 and since 1932 hives which could be brought on by trial with non-absorbent cotton or by sleeping on a cotton-filled mattress. He was sure that he also was allergic to cottonseed oil, reporting that he got hives and prolonged abdominal distress with acute gripping pain and diarrhea if he ate even a little of it in foods, for example in baked goods made with vegetable oil shortening.

The other patient was a 34-year-old man with asthma who showed an allergic reaction to skin tests with cotton and cotton-

seed, but who stated he had no symptoms from eating cottonseed oil.

Special blood tests, called passive transfer tests, showed that the asthma patient's blood had material that would pass on to others sensitivity to cottonseed, but the blood of the physician did not.

The allergy specialist was then persuaded to try taking some cottonseed oil, along with corn oil and olive oil, to see whether he could tell by his reactions which was the cottonseed oil. The samples of oil were made to look and taste alike. The allergy specialist was not able to tell the oils apart in quantities commonly present in foods, such as bread or salad.

Science News Letter, July 16, 1949

## GEOLOGY

## Billion-Year-Old Burrows Found in Michigan Rocks

► BILLION-year-old wormholes, or burrows made by some creature equally low in the evolutionary scale, have been identified in Michigan rocks by Dr. Henry Faul, Massachusetts Institute of Technology geologist, who reports his studies in the science magazine, *NATURE* (July 2), published in London. Traces of life of any kind in rocks as old as this are exceedingly rare.

Some of the burrows are as much as two feet long, and all of them curve and wind more or less. Average width is about one-eighth inch. Dr. Faul suspects that the worms, or whatever made the burrows, were feeding on decaying vegetable or animal matter left on top of ancient shore sand that subsequently hardened into quartzite.

The specimens were found in a gold mine near Ishpeming, Mich. Age estimates based on helium contained in rocks of the same mine are on the order of 1,200,000,000 years.

Science News Letter, July 16, 1949

## MEDICINE

## Red Noses Believed To Be Caused by Guilt Feeling

► A DEFINITE personality type has been established for the disease called "brandy nose" or rosacea in medical language.

Dr. I. B. Sneddon, of Sheffield, told the British Medical Association at its meeting in Harrogate, England, that the condition which produces a red coloration of the nose, forehead, and cheeks is brought on by an acute emotional crisis involving guilt or indignation.

In support of his theory he quoted studies made on patients with rosacea at the Sheffield Royal Infirmary.

"The fact that so many methods of treatment are successful in improving rosacea is further evidence that the condition is psychosomatic in origin," he declared.

Science News Letter, July 16, 1949

# IN SCIENCE

## PALEONTOLOGY

## Rare Fossil of "Croc"-Like Animal Given Smithsonian

► ONE of the rarest of fossil finds, the skeleton of a phytosaur, crocodile-like animal that lived 150,000,000 years ago, has been received at the Smithsonian Institution in Washington. It was found in Arizona by workers of the U. S. Geological Survey.

Although shaped like crocodiles and living more or less as they do, the phytosaurs were not closely related to the "crocs." They were closer kin to the dinosaurs, though the cousinship even here was rather remote. The true crocodiles began to evolve at about the same time as the phytosaurs, and apparently were the fitter to survive. At any rate, they have survived, and there have been no phytosaurs since Upper Triassic geologic time.

Since most phytosaur skeletal remains hitherto turned up have been fragmentary, the newly discovered, almost complete skeleton has especially high scientific value.

Science News Letter, July 16, 1949

## PSYCHIATRY-MEDICINE

## Mentally Ill Less Likely To Be Hay Fever Victims

► THE MAN who has hay fever may be afraid that it will drive him crazy, but if he really were crazy he probably would not have hay fever. The mentally ill do not generally suffer from this affliction.

At the height of the ragweed season, tests were made on 1,875 patients at the Coatesville, Pa., Mental Hospital of the U. S. Veterans Administration, and on 757 well employees of the same institution.

Signs of hay fever or other allergy were found in only 2.9% of the patients with the common mental illness schizophrenia and in only 1.4% of those suffering from manic-depressive psychosis. By contrast, 13% of the employees had allergies from the ragweed pollen. Among epileptics the incidence was the same as in the comparison group of employees—13%.

Somewhat more of the patients had a history of allergic symptoms in the past than were actually showing signs of allergy at the time of the test. Altogether, 5.7% had such a history. Of the comparison group, 21% had a history of past symptoms.

Details of the test are reported in the *AMERICAN JOURNAL OF PSYCHIATRY* (May), by Dr. Robert M. McAllister, of the Coatesville Hospital, and Dr. Arthur O. Hecker, clinical director of the institution.

Science News Letter, July 16, 1949



# SCIENCE FIELDS

## NUCLEAR PHYSICS

### Exploding Atoms Mailable If Radioactivity Is Weak

► EXPLODING atoms may now be sent by mail.

New Post Office regulations allow isotopes, clock dials, uranium ores, luminous compounds, and radium paints to be mailed if their radioactivity is weak enough.

The amount of radiation at the surface of the package is limited to one-tenth of the maximum that is considered safe for human body exposure daily. In terms of the measurement of radioactivity, this is 0.010 of a roentgen during one day.

This is less radioactivity than would fog an undeveloped photographic film in 24 hours.

Uncle Sam's mailmen have relaxed their stringent embargo on radioactivity because of an increasing demand from industry to allow the mildest sort of radioactive materials to be carried in the mails. Heretofore, except for very small quantities of luminous paint and polonium, a radioactive element, radioactive materials have had to be sent by express.

The radioactive materials sent by mail may be in the form of liquids, solids or gases, but they must be properly packaged and labeled. The gamma radiation must be less than 10 milliroentgens for 24 hours at the surface of the parcel, and there must be no significant alpha, beta or neutron radiation.

Science News Letter, July 16, 1949

## ENGINEERING

### Device Records Time on Teletypewriter Messages

► A STATION identification and time line is added automatically to almost every telegraphic message sent out by the Army Communication Center in the giant Pentagon building in Washington, by means of a complicated electronic device invented in the center's shop by Syrl K. Ferguson, the Office of the Signal Corps has revealed.

This automatic device saves the necessity of making a manual notation on a message of the time it was sent, and it guards against the possibility of errors in the record. The heart of this electric timer is an electric clock. The time line, which includes station identification, is added to the end of the message, and it gives a record of the exact time the message is received at its destination or at the first relay station en route. It operates only for outgoing messages. Incoming communications must still be recorded manually.

This timing mechanism is designed to serve a maximum of 100 teletypewriter circuits that are operated by hole-punched paper tapes. It also stops and starts transmitting machines when appropriate and, after adding the station identification and dispatch time to the message, causes the tape to move enough to permit tearing it between messages. By adding more circuits, the message timer can be enlarged readily to serve many more machines than the present 100.

Science News Letter, July 16, 1949

## GENERAL SCIENCE

### Atomic Scientist Attacks Non-Communist Affidavit

► REQUIREMENT of a non-Communist affidavit from scientists receiving Atomic Energy Commission fellowships was bitterly attacked by an atomic scientist.

Dr. Leo Szilard of the University of Chicago criticized science leaders for accepting the affidavit. Writing in the *BULLETIN OF THE ATOMIC SCIENTISTS* (June-July), Dr. Szilard called the AEC fellowship oath "the lesser evil."

Science leaders agreed to the oath to ward off a requirement that all fellowship candidates be investigated by the FBI, the physicist contended. Dr. Szilard said they felt the oath was a lesser evil, but he believes they were wrong.

If it's "reasonable," as some science leaders stated, to ask for the oath, Dr. Szilard argues that it is also reasonable to refuse to take an applicant's word that he is not a Communist. The result, he points out, would be an investigation of all applicants for fellowships. In the end, suggests the University of Chicago scientist, it might be felt "reasonable" to investigate all faculty members and students of universities receiving federal aid.

Scientists criticized by Dr. Szilard for acceptance of the affidavit requirement include Dr. A. N. Richards, University of Pennsylvania scientist and president of the National Academy of Sciences, Dr. Detlev W. Bronk, president of Johns Hopkins University and chairman of the National Research Council which administers the AEC fellowships, and members of the executive committee of The American Institute of Physics. Members of the committee are: Prof. G. R. Harrison of the Massachusetts Institute of Technology; Dr. Paul E. Klopsteg, president of Central Scientific Company, Chicago; Prof. F. W. Loomis of the University of Illinois; Prof. George B. Pegram of Columbia University; and Wallace Waterfall of the Acoustical Society of America.

The Institute committee approved the oath requirement in a statement sent to the Congressional Joint Committee on Atomic Energy, while Drs. Richards and Bronk testified before the committee on the subject.

Science News Letter, July 16, 1949

## GENERAL SCIENCE

### Choice Wood for Army Skis Bought Back from Europe

► CHOICE hickory wood needed for American Army skis has been sent to Europe and bought back at premium prices by U. S. ski makers, an Army officer told a scientific meeting on wood in Washington.

Lt. Col. R. H. Wilhelm, a wood expert from the Department of Army's Quartermaster Corps, described the exacting requirements for wood for Army skis at a symposium sponsored by the National Research Council and Office of Naval Research.

Col. Wilhelm declared, "Several manufacturers have stated that large quantities of choice hickories are being shipped to several European nations and in various instances it has been necessary for manufacturers in the United States to buy our hickories back from these same European nations."

"The result is that they must pay an enormous premium for this wood," he charged.

This situation "may have been taken care of" in the past few months, Col. Wilhelm added.

If you've had any trouble getting plywood in the last few months, the Quartermaster Corps may be to blame, the spokesman indicated.

Col. Wilhelm said that the Corps has procured half a million locker trunks—25 square feet of plywood in each one—during the past six months.

The Army officer said he understood that this had "caused a considerable drain on the plywood manufacturers due to the accelerated delivery schedule we had in the contract."

Science News Letter, July 16, 1949

## ASTRONOMY

### Camera Replaces Eyes for Reading Astronomy Scales

► ASTRONOMERS no longer rely on their eyes to read off the scale markings on their most precise instruments.

E. G. Woolsey of the Dominion Observatory, Ottawa, Canada, told the American Astronomical Society meeting that cameras are being used to photograph the division marks on the declination scale of the Observatory's meridian circle telescope.

Declination measure of star positions, made with this telescope, can be used to determine latitude exactly. Latitude changes because the axis on which the earth rotates keeps moving around a bit inside the earth. Greatest change from a mean position is about 40 feet.

A similar use of camera apparatus is for similar studies at the U. S. Naval Observatory in Washington.

Science News Letter, July 16, 1949

## CHEMISTRY

# Strange, Versatile Plastic

Polyethylene-made plates, cups and ice box dishes are tasteless, odorless and unbreakable. The plastic is also used for pipes in industry and tubes for surgery.

By MARTHA G. MORROW

► POLYETHYLENE, one of the newest of the plastics, is also one of the strangest:

Dishes of this gas-derived resin float on the sudsy water in which they are to be washed.

Few chemicals affect it, and even those in which it will dissolve must be heated before they act as a solvent.

Thin films of the plastic are soft and pliable, thick slabs of it are tough and horny.

Plates, cups and ice box dishes that are tasteless, odorless and unbreakable are made from polyethylene. Films of it provide packaging material for both commercial and home use. Bottles, tops, materials for shoes and handbags, and even drain pipes are created from this unique plastic.

As early as 1933 it was known that ethylene, used for anesthetics and to hasten the ripening of fruit and vegetables, could be polymerized, that is, linked together in long chains to form a resinous material. After pilot plant trials for several years, commercial quantities were first produced in the United States six years ago. Most of the early production of polyethylene was used to insulate high-frequency wire and cable, so essential to the war effort.

## Made from Ethylene

This new material is made from ethylene at high temperatures and high pressures. Composed of long chains of hydro-carbon groups consisting of carbon atoms combined with twice as many hydrogen atoms, polyethylene shows great promise as a versatile plastic. Today, for instance:

Large pipes of polyethylene carry hot nitric acid in atomic energy plants, while tiny tubes of the plastic have been used to control bleeding stomach ulcers.

Bottles of polyethylene are strong enough to transport liquids great distances and under rough conditions, yet flexible enough for the containers to be used as atomizers upon reaching their destination.

During 1948, approximately 15,000,000 pounds of polyethylene were produced in this country. About 6,000,000 pounds were made into film for packaging everything from garden soil to frozen foods. This year Bakelite and duPont expect to more than triple production of this raw material so that an estimated 20,000,000 pounds will be used for film, an equal quantity for coating wire destined for television, radio and electronic applications, and another 8,000,000 or so for molded cups, plates and

so on.

Polyethylene is the lightest of the plastics. It weighs less than an equal quantity of water, its specific gravity being .92. Thus pellets of the plastic float on water and even a polyethylene tumbler filled with water does not sink to the bottom.

It softens at a temperature a little below that of boiling water, and, therefore, dishes made of it should not be placed in boiling water. They may, however, be rinsed in very hot water (170 to 180 degrees Fahrenheit) without harm.

One of the outstanding characteristics of polyethylene is its chemical inertness. Few materials mar the good looks of its satiny surface. It is insoluble in all organic solvents at normal room temperature.

## Acids Don't Stain

Vinegar, lemon juice and acetone, if left on the plastic, leave no mark or stain when wiped off. The plastic does dissolve in carbon tetrachloride (frequently used as a household cleaning fluid), but this material must be heated to about 140 degrees Fahrenheit to be effective.

This chemical inertness of polyethylene makes it more difficult to seal pieces together with a solvent than with heat. Thin films are usually sealed with a hot iron or similar equipment; thick pieces are welded together by using gas-welding equipment or hot air.

One of the advantages of polyethylene, on the other hand, is its inherent flexibility; thus no plasticizer need be used. The resin merely is heated, then molded into cups or extruded into thin films.

Impermeability to all but a very few liquids and gases, plus the fact that it is odorless and tasteless, is largely responsible for the success of polyethylene film.

Its uses range from washers for your sink or washbowl to disposable bottles for baby's milk to liners for drums in which chemicals are shipped.

A novelty woven fabric is being made from polyethylene. This material, developed specially for shoes and handbags, is made by slitting thin film into ribbons, folding it, and then weaving it into cloth with a pack weave. One of the advantages of this type of cloth over other plastic cloth is that it has enough body to hold its shape, while still retaining its flexibility.

Circular tubing as well as flat films of polyethylene are popular. Such tubing has transparent walls only .001 to .004 inch thick. Miles and miles of this tubing are made by forcing the hot plastic through

a narrow circular opening. The tubes can be heat-sealed where desired, producing long or short bags without seams.

Thin films of polyethylene are also being used to protect paper, cloth and metal. A coating only .0015 inch thick, for instance, converts shelf paper into a washable article giving long service.

This very thin coating can be applied either to paper or cloth in two ways. It can be put on by knives that place a fine layer on the material as it passes beneath them. Or an extremely thin polyethylene film can be laminated to the paper or cloth with an adhesive.

By either of these methods, however, 15 pounds of polyethylene will coat 3,000 square feet with a layer .0015 inch thick. That means the coating is about one-half as thick as the page of the daily newspaper which you read. Thin as this layer is, it provides all the necessary protection to the underlying cloth or paper.

In general, polyethylene resins are fabricated in almost exactly the same manner and in many of the same types of machinery as other thermoplastic materials. The principal differences between this and other plastics is that polyethylene softens and becomes quite fluid at a lower temperature. On the other hand, it can be molded at extremely high temperatures.

At the higher temperatures, however, shrinkage becomes a problem. Thus, in the molding of polyethylene, dies must be



**TOUGH BUT PLIABLE**—Thin, transparent polyethylene plastic has outstanding qualities for keeping what's inside in and what's outside out. This makes it useful for packaging foods.





**FLEXIBLE CONTAINER**—Squeezable bottle made of polyethylene is both a container and an atomizer, being used for nosedrops and deodorants.

designed to allow for the material to shrink as much as 4% as it cools, although other adjustments can reduce this to as little as 2½%. Thick sections also require special cooling techniques to avoid the formation of voids or bubbles in the center.

Films of polyethylene are outstanding for their folding resistance. They may be creased, yet readily spring back into shape when released. Also these films do not become brittle upon long exposure to freezing and below-freezing temperatures. They have a soft, warm and somewhat waxy feel. Thick sections of the plastic bounce when dropped.

Polyethylene is highly transparent in thin layers immediately over an object, but it is translucent when thick. It naturally is colorless, with a "frosty" appearance. Dyes and pigments may be added, however, to produce a wide variety of colors.

Polyethylene, like many other plastics, is produced in a variety of grades, each with different physical properties. In some grades, many more atoms of hydrogen and carbon

—but always the same proportion of two atoms of hydrogen to one of carbon—are linked together to form each molecule of polyethylene than in others. Thus some have a much higher molecular weight than others.

Polyethylene of very low molecular weight is a grease or wax; that of medium molecular weight is a soft wax-like resin; and that of very high molecular weight, the kind used in articles being sold now, is tough and horny. In all cases, however, the molecules are formed of carbon atoms joined together to form long chains.

*Would you like to examine some polyethylene products yourself? A bouncing measuring cup (1, 1½ and 2-ounce) with an air- and liquid-tight cover is included in a kit assembled for you by Science Service. Samples of polyethylene resin, tubing, coated papers and cloth, and woven fabric as well as explanatory material will be sent you for only 50 cents. Write Science Service, 1719 N Street, N. W., Washington 6, D. C.*

Science News Letter, July 16, 1949

#### NUTRITION

## New Food Process Danger

➤ **WARNING** of a possible danger of a chemical contamination of food from a new food process was issued by the Council on Foods and Nutrition of the American Medical Association.

The process consists in adding chemicals to foods such as bakery products to make them stay fresh longer, or to give them a

smoother texture or some other attractive quality. The chemicals, of which there are hundreds, are known as "surface-active" compounds. Some of the most widely used are derived from polyoxyethylene combined with fatty acids and sometimes with a special alcohol known as sorbitol.

The process is viewed with alarm, Dr.

James R. Wilson, secretary of the Council, states in the *JOURNAL OF THE A. M. A.* (July 2), because little is known about the poisonous effect of the surface-active compounds being added to the food or what effect they have in reducing nourishing value.

The food to which the compounds are added are usually smooth-textured, have more sales appeal and contain less fat. In bread and bakery products there may also be lowering of important food ingredients because the compounds have the ability to produce the same properties of "freshness" as the nonfat milk solids.

If, in addition to bakery goods, these agents were added to such foods as ice cream, candy and peanut butter, the public would be consuming a large quantity of the compounds whose possible poisonous qualities are as yet unknown, Dr. Wilson pointed out.

"Unless the complete harmlessness of these agents can be demonstrated beyond reasonable doubt, they should not, in the Council's opinion, be employed in basic foods," he stated.

The second danger, that of reducing the nutritional value of food, stems from the fact that less fat, milk solids and sometimes eggs are required when the compounds are added to the food.

"Thus far, the use of these substances is limited," an editorial in the same issue of the *JOURNAL* declares, "but their possible range of application includes almost all foods containing starch or fat. When a chemical technologic aid may find its way into the daily diet of nearly everyone from infancy to the grave, the necessity for being assured of its safety becomes significantly increased."

The editorial concludes with the warning that it is an invitation to trouble to ignore the need for preliminary study.

The U. S. Food and Drug Administration in Washington is currently holding hearings on the use of these substances in bread. After all the evidence is in, Food and Drug is expected to issue a ruling, technically termed a "definition", as to whether such substances can be added and in what quantities and to what products.

Science News Letter, July 16, 1949

## On This Week's Cover

➤ A FAIRY-LIKE creature with strange offspring is the golden-eyed lace-wing fly shown on the cover. Mother lace-wing has transparent lace-like wings of pale green hue and beady golden eyes that glisten in light. But her children, in the earlier stages of a strange life cycle, are another matter. They are the aphid lions which feed on plant lice. These aphid lions are so blood-thirsty when born that each egg is laid on the end of a separate tiny silken stalk so that the aphid lions will not eat each other.

Science News Letter, July 16, 1949

## MEDICINE

## Warn Against Antiseptics

➤ A WARNING that acute skin inflammation may be caused by organic mercury compounds used as antiseptics is issued by Drs. L. Edward Gaul and G. B. Underwood, skin specialists of Evansville, Ind., in the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* (July 9).

"Interestingly, the color, red, really signifies danger," they declare, referring to the red color of these compounds.

Merthiolate, mercurochrome, metaphen and mercesin are the compounds they specifically warn against.

The "continued popularity" of these compounds among surgeons preparing the skin for operation is attributed by the Evansville physicians to the fact that in most surgical cases the compounds are applied to normal skin. It is when the skin barrier has been broken by infection, burns, tears, scratches and scrapes such as those occurring in automobile accidents that the organic mercury compounds are likely to cause trouble.

The skin inflammation may not develop immediately, but in persons who have become sensitized to a particular compound, second use of the same compound is likely to produce skin inflammation very quickly.

The inflammation usually appears as little blisters or pimples around the original injury and is often considered an infection. Unless the role of the organic mercury compounds is known, one of them is likely to be used to treat the supposed infection, a measure which is likely to make the trouble worse, or at least keep it going.

Five out of 20 patients sensitized by these compounds were so sick they had to be put in a hospital for treatment.

Patch tests, something like those given for allergies, were made on 400 patients with skin disease. Positive reactions occurred in 40%, or 160 patients. The reactions were to the remedies they had used. In 56 cases the "offender" was one of the organic mercury compounds.

Science News Letter, July 16, 1949

## PHYSIOLOGY

## You Can Stand High Heat

➤ IF YOU are wondering how much hotter it can get and how much longer you can stand this sweltering summer heat, scientists have an answer for you.

If the temperature were 240 degrees Fahrenheit, instead of the 90 to 100 degrees your outdoor thermometer may be registering, you could probably stand it for about 23 minutes.

This "average limit of human tolerance," 240 degrees Fahrenheit for approximately 23 minutes, was announced at the meeting of the American Society of Heating and Ventilating Engineers in Minneapolis.

The limit figures were discovered in studies with student volunteers. The studies were made by Craig L. Taylor, associate professor, and W. V. Blockley, research

associate, of the department of engineering of the University of California.

Their research was spurred by problems of supersonic aircraft, though human tolerance for extremely high temperatures has long been a problem of industrial physiology and hygiene. If the cabin air conditioning system of a very high speed plane failed, heat would become a hazard to pilots and occupants. At low altitudes on a 100-degree summer day air temperature in the cabin at a speed of 800 miles per hour would, if the air conditioning failed, rapidly reach 215 degrees, or three degrees above the boiling point of water.

Industrial exposures to high heat also occur. A plastics engineer regularly spends 10 minutes out of each 30 in an oven at 200 degrees Fahrenheit. A kiln technician is exposed many times for two or three minutes at a time to 250 degrees and sometimes to 500 degrees. Mining engineers tell of rescue parties exploring pockets in a burning mine where temperatures ranged up to 240 degrees.

Hot air inhaled by the students in the tests was cooled as much as 100 degrees Fahrenheit in a few inches of travel down toward the lungs. This cooling action of the mucous membranes lining the nose, mouth and breathing passages was one of the observations made.

Although the heart rate was speeded from the normal of around 75 beats per minute to 160, electrocardiograms taken before and after heat exposure showed no distinct signs of heart damage.

The maximum mean skin temperature was 107 degrees Fahrenheit, reached in an exposure to 240 degrees.

"Air hunger" was commonly felt in all exposures carried to the tolerance level. With this there was deep, irregular breathing, restlessness and nervous irritability. Waves of dizziness developed at the finish of the tests.

The studies were made with "intelligent and manful cooperation" by the students in a five-foot, ten-inch heat chamber. Humidity was not controlled but resulted from outdoor temperature and the moisture added by the volunteer. Clothing for the test consisted of a close-fitting wool and cotton one-piece union suit eight-hundredths of an inch thick and loose-fitting felt duffel socks.

Science News Letter, July 16, 1949

## ENGINEERING

## Room Humidity Depends on Proper Sidewall Materials

➤ THERE is a relation between the humidity in a room and the material of which the walls of the room are made, it was pointed out to the American Society of Heating and Ventilating Engineers in Minneapolis by Prof. E. R. Queer of Pennsylvania State College. The fundamental thing that heating engineers must determine to make proper installations is how fast moisture can be transmitted through the sidewall material, and he described a new instrument for measuring this vapor transmission.

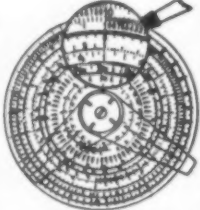
The rate of transmission is known to technical men as the "permeance" of the material. Many devices have been used to measure permeance, he said, but a new method has been developed at the institution he represents which overcomes some of the limitations of former methods and provides a means of testing thicker materials.

This new method involves the use of an apparatus in which the material being tested can be sealed between two cups, thus eliminating the need for humidity control of the surrounding atmosphere. Within one cup of the double-cup cell a pan of water is placed. In the other is placed a water absorbing substance, what chemists call a desiccant. Water from the pan gradually passes through the material under test to the desiccant. The loss of weight in the water in the pan is measured, and the gain in weight of the desiccant. Both weighings can be made without removal of the water and desiccant pans from their chambers.

Permeance of a material tested with this apparatus, he said, depends upon the weight of the vapor transmitted, the time required for transmission, the area of the specimen and the difference in vapor pressure in the two chambers. F. A. Joy, of Pennsylvania State College, was co-author of the paper presented.

Science News Letter, July 16, 1949

**THE BINARY SLIDE RULE**



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**Gilson Slide Rule Co., Box 993, Stuart, Fla.**  
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## ENGINEERING

# Oxygen in Steel Making

► THE increasing use of gaseous oxygen in the British iron and steel industry will be reviewed by D. J. O. Brandt of the British Iron and Steel Research Association at the meeting of the UNSCCUR at Lake Success, N. Y. this summer, it was revealed.

UNSCCUR is short for the international group whose full name is the United Nations Scientific Conference on the Conservation and Utilization of Resources. The use of oxygen instead of air in blast furnaces of various types has made great progress since the closing of the recent war, and is now widely used both in America and Europe. There is still much to be learned relative to its economical application, and the English experience will add to world knowledge.

The open-hearth furnace, the electric furnace and the steelmaking converters have all been shown to benefit considerably under certain conditions, Mr. Brandt will state. To a lesser extent the blast furnace for the production of pig iron and ferro alloys has also been considered with regard to improving performance with an enriched blast.

The basic causes of the recent upsurge of interest are probably two-fold, firstly the

desperate world-wide steel shortage stimulating any and every means of increasing the productivity of existing plants, and secondly the prospect that within a comparatively short time "medium purity" oxygen will no longer be an expensive commodity, he will state. Another possible reason is the need to conserve natural resources. Under certain conditions the employment of oxygen may be accompanied by savings both in fuel and certain raw materials.

Oxygen has been applied to the open hearth to accelerate both melting and refining. The electric furnace has also been shown to benefit considerably when oxygen is used as a refining agent. Enrichment of the blast in steelmaking converters has been undertaken at several places, giving increased outputs and improved quality of products.

Enrichment of the air blast in a normal blast furnace has not proved quite so advantageous, according to Mr. Brandt. This is largely because the blast furnace is thermally a very efficient machine. But the use of small, low shaft furnaces particularly designed for oxygen work may enable low-grade ores to be smelted which were

hitherto uneconomical, and may also be applied to the smelting of ferro alloys which normally are produced in the electric furnace.

Science News Letter, July 16, 1949

## Words in Science— INSECT-BUG

► NOT ALL those pests that you chase or that chase you in the garden and at the beach are properly called bugs—or insects either.

The scientist likes to reserve the word "bug" for a certain kind of insect with fore wings shorter than the hind wings and with a piercing, sucking beak. Typical bugs are squashbugs, stinkbugs, and bedbugs.

The word insect is derived from the Latin and means "cut into" which refers to the form of the body. It is divided into a head, a thorax of three segments from each of which grows a pair of legs, and an abdomen of 10 segments. The principal clue to the identification of insects is the number of their legs—six.

A spider, which has eight legs, is not properly called an insect. Neither is a centipede.

Science News Letter, July 16, 1949

## The Lifeblood of Industrial America

# OIL! TITAN OF THE SOUTHWEST

by Carl Coke Rister

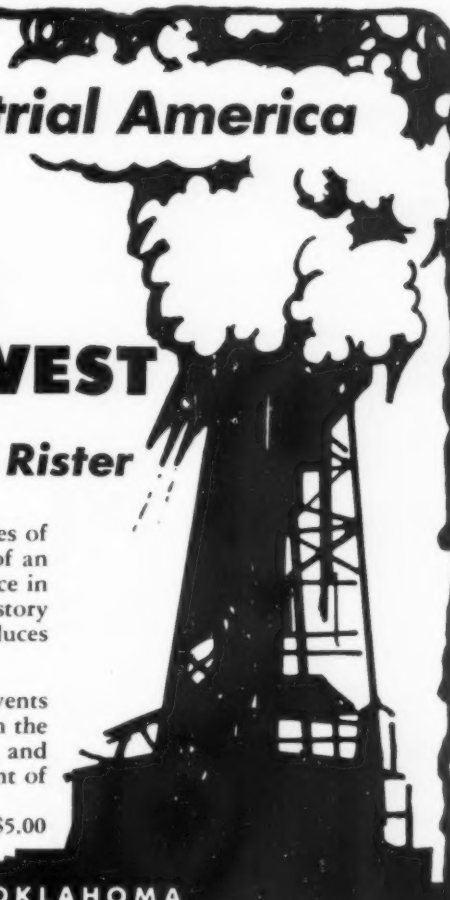
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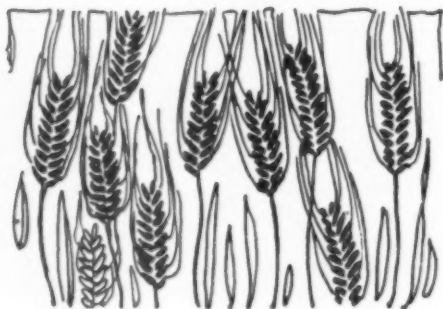
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### All Flesh Is Grass

► NEBUCHADNEZZAR, the king who literally "went to grass" has become a traditional figure of pity, mingled perhaps with a little contempt. Though in his madness he gnawed the grass at its roots, his fall was not so great as we may fancy—only the height of a grass-haulm. For all of us, wise men and madmen alike, are eaters of grass; only we ordinarily feed at the top instead of the bottom of the stem.

Everyone who eats bread, or rice, or tortillas, or oaten porridge, or polenta, or hominy grits, or any other food made from grain, eats grass. All grains are grasses, and all the grain we grind and eat is the seed of grasses.

When you stir cane sugar into your coffee or tea, or eat it in candy or ice cream, you are again a grass-eater, this time at a slight remove. Sugar cane is also a giant grass, and sugar is merely its boiled-down and refined sap.

Finally, when you eat meat or cheese or butter or drink milk, you are getting your grass second hand. All our meat and dairy animals feed on grass, and if beeves and hogs are finished for the market on grain,

they are eating grass seed just as we do in our bread or rice.

Except for the grasses which the cattle eat, the species chosen by man for cultivation are the giants of their tribe. Sugar cane, corn and bamboo are the biggest of all grasses, while wheat, rice, rye and the other so-called "small grains" are still much larger than the great majority of grass species.

Of course the grains were selected by early man as his principal food not because of their height but for the size of their seed. There are a good many other tall

grasses, some of them taller than wheat or rye, that were never given the advantages of cultivation, simply because their seeds are too small or too scanty to be worth the labor of harvesting and grinding.

While our cultivated grains are undoubtedly bigger and more prolific than their wild ancestors, even in the wild forms they were worth the trouble of collecting and preparing. It is even suggested by some anthropologists that agriculture originated from the sprouting of seed gathered in the wild and chance-scattered near primitive man's dwellings.

Science News Letter, July 16, 1949

### PSYCHOLOGY

## Machine Tests Logic

► SCIENCE now has a machine that flashes a stop light at an illogical argument.

It can't be used in Congress or in a street corner argument. Dr. Benjamin Burack of Roosevelt College, Chicago, explains in his report to the journal, *SCIENCE* (June 17) that the machine has to be set up for particular argument before it will operate.

To operate the machine it is necessary to select blocks to represent the major premise, minor premise and conclusion and put these blocks into three spaces provided on the panel of the machine. A light then automatically flashes on for each fallacy in the argument and a printed card beside the light describes the fallacy in

logical terms.

The whole machine is mounted in the top of a suitcase and the blocks used are in plywood compartments in the bottom part of the case. The entire outfit weighs only 25 pounds.

Limitation of the machine, according to its inventor, is that the argument must first be put into logical form before the appropriate blocks can be fed into the machine.

Earlier machines, Dr. Burack says, have been developed to indicate the conclusions which can be drawn from given premises, but none of them was capable of testing the logic of conclusions already drawn and pointing out and identifying the fallacies.

Science News Letter, July 16, 1949

### POPULATION

## Asia Over-Populated

► WILL the peasant of Asia change his ways of early marriage and frequent babies in time to prevent the population explosion that threatens the East? This is the question raised by a population expert, Dr. Irene Taeuber, of Princeton University, before the meeting of the Population Association of America in Princeton, N. J.

Dr. Taeuber believes that the Asiatic peasant will change his ways and limit his family, but it is a question whether he can change quickly enough to avert the calamity that will otherwise inevitably result from the tremendously increasing population under conditions of modernization and reduced death rates.

The peasant in Asia developed his ideas about having babies in pre-modern times, Dr. Taeuber explained. Then a high death rate, an infant mortality rate probably well above 200 per 1,000 births, periodically severe malnutrition, an occasional epidemic, civil disorders and violence all combined to make permanent survival of the group precarious.

In the face of such hazards, individual groups would have been wiped out if it had not been for high fertility rates.

But behavior developed over thousands of years as one essential to survival, Dr. Taeuber pointed out, now produces such an abundance of children that their numbers menace survival at the more humane levels made possible by order, medical and sanitary technologies and improved agriculture.

But Dr. Taeuber has no doubt that the Asiatic ideas about size of family will change.

"There is accumulating evidence," she said, "that fertility yields under the stimulus and the pressures of modernization, whether the group concerned be the Catholics or the Protestants of the West, the Confucians of China, the Buddhists of Siam, the Shintoist of Japan or the Moslems of Indonesia."

Although some people think that the present traditions with regard to family are accepted unquestioningly by the Asiatic peasant because they always have been and nothing else is envisioned as possible, Dr. Taeuber points to evidence of tensions in the upper groups as revealed by literature and in the peasant masses by the ever-recurrent problem of infanticide.

Science News Letter, July 16, 1949

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# Books of the Week

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**THE ALCHEMISTS: Founders of Modern Chemistry**—F. Sherwood Taylor—*Schuman*, 246 p., illus., \$4.00. A contribution to the history of science and thought. For the well informed layman. Of British origin.

**AMERICA'S HEALTH: A Report to the Nation**—National Health Assembly—*Harper*, 395 p., \$4.50. The official report of the Assembly which met for a four-day session in May 1948.

**FEMALE SEX ENDOCRINOLOGY**—Charles H. Birnberg—*Lippincott*, 134 p., illus., \$4.00. Designed to serve as a quick reference as needed in the everyday practice of medicine.

**FERTILITY AND HATCHABILITY OF CHICKEN AND TURKEY EGGS**—Lewis W. Taylor—*Wiley*, 423 p., illus., \$5.00. Reports of research put into terms of practical application.

**THE GROWTH OF THE EXPERIMENTAL SCIENCES: An Experiment in General Education**—James Bryant Conant—*Harvard University Press*, 67 p., paper, free upon request by interested college professor or educational administrator to Mr. Guy Snively, 726 Jackson Place, N. W., Washington, D. C. An experimental method of teaching a general course on science to non-science students by the "case method."

**HIGHWAY RESEARCH REVIEW: A Summary of National Highway Research Activities Reported by the Research Correlation Service**—Vol. 1, No. 1—R. W. Crum and Fred Burggraf, Eds.—*Highway Research Board*, 28 p., paper, quarterly, 45 cents a copy. This first number provided a classified listing of highway research projects in progress or recently reported. Future issues will contain articles on current research.

**INTERNATIONAL DIGEST OF HEALTH LEGISLATION**, Vol. 1, No. 1—*World Health Organization*, 144 p., paper, \$1.25. This journal will consist of reprints and translations of or extracts from the texts of the most important laws and regulations dealing with public health in different countries.

**INTRODUCTION TO RADIOCHEMISTRY**—Gerhart Friedlander and Joseph W. Kennedy—*Wiley*, 412 p., illus., \$5.00. A text book for students of chemistry on the graduate or senior undergraduate level. The senior author is chemist at the Brookhaven National Laboratory.

**M. I. T. LIBRARY ANNUAL 1948**—Vernon D. Tate and Margaret P. Hazen, Eds.—*Library, Massachusetts Institute of Technology*, 84 p., paper, 75 cents. Containing articles of particular interest to librarians.

**MANUAL OF THE INTERNATIONAL STATISTICAL CLASSIFICATION OF DISEASES, INJURIES, AND CAUSES OF DEATH Vol. I: Sixth Revision of the International Lists of Diseases and Causes of Death. Adopted 1948**—*World Health Organization* 376 p., paper, \$6.00. To facilitate the keeping of comparable international statistics.

**MODERN SCIENCE AND ITS PHILOSOPHY**—Philipp Frank—*Harvard University Press*, 324 p.,

\$4.50. Development of thinking originated in company with a group of other students in Thursday evening bull sessions in a Viennese coffee house. The book includes a critical discussion of Soviet philosophy.

**NUTRITION SURVEYS: THEIR TECHNIQUES AND VALUE**—Committee on Nutrition Surveys—*National Research Council*, 144 p., paper, \$1.50. Intended to contribute to the better understanding of the value and purpose of nutrition surveys and to the development of improved techniques for conducting them.

**SEASHORE TREASURES**—Charles Howard Edmondson—*Pacific*, 144 p., illus., \$3.50. A timely book for those who wish to pursue their knowledge of nature during a seaside vacation. The seashore creatures are described in non-technical terms and by photographs. Although based on the fauna of Hawaii, it is applicable to many parts of the world.

**TIN: Its Mining, Production, Technology and Applications**—C. L. Mantell—*Reinhold*, 2d ed., 573 p., illus., \$10.00. A reference work for those connected with the production or processing of tin. One of the monograph series of the American Chemical Society.

**WHITE COLLAR ZOO**—Clare Barnes, Jr.—*Double-day*, 74 p., illus., \$1.00. A collection of delightful animal photographs which reminded the author of familiar office personalities from the bearded lion who is pictured as president and chairman of the board to the herd of sheep who represent the morning rush hour.

Science News Letter, July 16, 1949

## GENETICS

### Identical Twins May Be Frequent Among Antelope

► IDENTICAL twins seem to be a frequent occurrence among the pronghorn antelope of the American West. Evidence indicating this was presented by Prof. C. A. Tryon, Jr., of the University of Pittsburgh.

Prof. Tryon made postmortem examinations of a number of pronghorn antelope does that had been killed in Montana. Six of them were found to be pregnant, and all six had twin embryos of the same sex. This is fairly strong indication, though not completely conclusive proof, that they were identical twins.

Science News Letter, July 16, 1949

## ASTRONOMY

### Newly Discovered Comet Is Growing Brighter

► COMET Bappu-Bok-Newkirk, the year's second comet, is growing a little brighter than it was when discovered July 2 at Harvard's Oak Ridge Observatory. Four successive observations by the Harvard dis-

coverers have been made. The comet is about 13th magnitude, which means that a good-sized telescope is necessary to spot it.

The discovering team consisted of a Harvard graduate student from Hyderabad, India, the associate director of Harvard Observatory and a Harvard senior—Vainu Bappu, Bart J. Bok and Gordon Newkirk, Jr. Comets are named after their discoverers, therefore the triple-barrelled name of the new visitor to the vicinity of the sun. Mr. Newkirk was a Science Talent Search winner in 1946 and his home is West Orange, N. J.

Science News Letter, July 16, 1949

## Does Loss of Hearing Rob You of Success and Happiness?

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❁ **GARDEN HOSE**, one-third lighter than ordinary hose, is made of a high molecular weight vinyl resin which resists oil, grease, sunlight, heat, cold, mildew and rot. This all-plastic hose, with an inside diameter of one-half inch, has full-flow capacity because of the smoothness of its inside surface.

Science News Letter, July 16, 1949

❁ **READING GLASS**, shaped like a ruler and with a lens over eight inches long, spans an entire line and magnifies the printing or writing two or three times. It is a self-supporting instrument that leaves the hands free, and can be adjusted to whatever angle or degree of magnification the user prefers.

Science News Letter, July 16, 1949

❁ **DOG COLLAR**, and leash, is the round leather collar type but is made of a specially developed pliable Vinylite plastic which has the important characteristic of low temperature flexibility. It is easily cleaned with a damp rag. A novel feature is an identification card built-in pocket.

Science News Letter, July 16, 1949

❁ **STITCHLESS COVERS** for household chairs, to re-upholster worn seats, as shown



in the picture, are made of two pieces of special plastic, with a filler between, heat-sealed into a "sandwich." The re-upholstering is easily accomplished by cutting to fit and tucking to the back of the wooden seat.

Science News Letter, July 16, 1949

❁ **DOG BATH** mixture, which comes in concentrated form in small capsules ready to mix with water, contains both cleansing detergents and controlled amounts of proper insecticides to kill ticks, fleas and mange mites. The synthetic soaps, containing steam-distilled pine oils, clean the animal's coat and leave no trace of stickiness.

Science News Letter, July 16, 1949

❁ **ELECTRICALLY HEATED** rubber strip, similar to those used to de-ice airplane wings and propellers, prevents the accumulation of frost inside frozen-food compartment doors or along the door seals of large deep-freeze units. It contains insulated resistance wires between layers of rubber sheeting.

Science News Letter, July 16, 1949

❁ **DAINTY PLASTIC** baskets in pastel colors, for individual servings of nuts or candy at a party dinner, have removable handles with plastic place cards attached on which names can be written, to be washed off later. When a larger card is needed, the handle is removed and a small slot on the edge of the basket holds the card.

Science News Letter, July 16, 1949

## Do You Know?

In protein value, fish is as nourishing as meat.

The little known metal *iridium* is nearly twice as heavy as lead.

About 70% of the oranges grown in America now reach consumers in processed form in cans or bottles.

Coal mining in Turkey started a century ago; the country has an estimated 500,000,000-ton reserve yet untouched.

A new variety of *sweet potato* does not crawl all over the ground like the ordinary kind but grows upright, like a bush one foot high.

About 25,000 tons of *palm oil* is used annually in the American steel industry; it is a lubricant in the cold reduction process of rolling steel sheet to a thinner type.

Scientists have discovered that the *eel* is a source of valuable oil, a poultry food and a fertilizer, as well as one of the richest vitamin packed foods in the world.

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